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Attorney's Docket: 2003DE408Serial No.: 10/783.724Art Unit 1714Response to Office Action mailed 10/12/2006

#### REMARKS

The Office Action mailed October 12, 2006 has been carefully considered together with each of the references cited therein. The amendments and remarks presented herein are believed to be fully responsive to the Office Action. Reconsideration of the present Application in view of the following remarks is respectfully requested.

Applicant has amended the claims to more clearly recite what Applicant believes to be the invention. In claim 1, Applicant has amended the range of the variable "m" to recite from 1 to 30 and canceled claim 5. Support for this amendment may be found in originally filed claim 5 and claim 1. In addition, Applicant has dropped claim 10. It is believed that this amendment does not add new matter to the Specification.

The objection to claim 10 under CFR 1.75(c) as being of improper dependent form is moot in view of Applicant's amendment canceling claim 10.

Claim 1 was rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the enablement requirement for not reciting a counterion. Claim 1 recites a quaternary ammonium cation. In Applicant's Specification in paragraphs [00039] and [00040], Applicant discloses that

*Where  $R^1$  is  $C_1$ - to  $C_{22}$ -alkyl,  $C_2$ - to  $C_{22}$ -alkenyl,  $C_6$ - to  $C_{30}$ -aryl or  $C_7$ - to  $C_{30}$ -alkylaryl, counterions for the compounds of the formula (1) are all anions which do not impair the solubility of the compounds of the formula (1) in the organic-aqueous mixed phases. Such counterions are, for example, methanesulfate ions (methanesulfate) or halide ions.*

*Where  $R^1$  is  $-CHR^5-COO^-$  or  $-O^-$  radicals, compounds of the formula (1) are betaines and amine oxides respectively and, as internal salts (ampholytes), have an intramolecular counterion.*

Thus, claim 1 does contain subject matter which is described in the specification in such a way as to enable one skilled in the art to make and use the invention.

Therefore, the rejection of claim 1 under U.S.C. §112, first paragraph, as failing to

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comply with the enablement requirement should be withdrawn.

Claims 1-4 and 6 were rejected under 35 U.S.C. §102(b) as being anticipated by Vartanian (U.S. Patent No. 4,171,959). The rejection of claim 1, as amended, under 35 U.S.C. §102(b) as being anticipated by Vartanian (U.S. Patent No. 4,171,959) should be withdrawn for the reason that as amended, m in Applicant's formula (1) is not 0, but ranges from 1 to 30. Thus, the bridge between the succinic acid group and the cationic nitrogen atom in the instant invention has an oxyalkylated structure in contrast to the bridging structure of Vartanian et al. which is a hydrocarbon structural unit. Furthermore, Vartanian et al. is directed to reducing exhaust gas emissions from fuels (such as gasoline or diesel which comprise hydrocarbon molecules having C<sub>4</sub> to C<sub>10</sub> molecules) which are burned in internal combustion engines. Applicant's invention relates to reducing gas hydrate formation. A gas hydrate is a hydrate consisting of a water lattice in which light hydrocarbon molecules, such as methane, are embedded resembling dirty ice. Hydrates normally form when a gas stream is cooled below its hydrate formation temperature in the presence of free water, such as when the gas is colder than its water dew point temperature. Conditions of pressure and temperature leading to hydrate formation are often found in pipelines. Secondary conditions such as high gas velocity, agitation and the formation of a nucleation site may also help form hydrates. Hydrate formation is undesirable because the crystals might cause plugging of flow lines, valves and instrumentation. This can reduce line capacity and cause physical damage to pipelines and equipment. Vartanian et al. is directed to an entirely different field of art related to burning hydrocarbon fuels and reducing exhaust gas emissions from internal combustion engines. It is fundamental that all elements of a claim must be found united in the same way to perform the identical function for a reference to establish anticipation. Anticipation is a technical defense which must meet standards: Unless all of the same elements are found in exactly the same situation and united in the same way to perform the identical function in a single prior art reference, there is no anticipation. Therefore the rejection of claim 1, as amended under 35 U.S.C. §102(b) as being anticipated by Vartanian et al. (U.S. Patent No. 4,171,959) should be withdrawn for the reason that nowhere in the Vartanian et al.

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reference is there disclosed a compound which has an oxyalkylated structural unit between a succinic acid group and a cationic nitrogen group for use in metal working or to reduce hydrate formation. The rejection of claims 2-4 and 6 under 35 U.S.C. §102(b) as being anticipated by Vartanian et al. (U.S. Patent No. 4,171,959) should be withdrawn for the reasons given in support of claim 1, as amended from which they depend.

Claims 7 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by Japanese reference JP 05193073 Kamijukkoku (hereinafter '073). The rejection of claims 7 and 8 under 35 U.S.C. §102(b) as being anticipated by Japanese reference JP 05193073 Kamijukkoku (hereinafter '073) should be withdrawn for the reason that the '073 reference is directed to thermoplastic film with antistatic properties and good printability, not gas hydrate formation prevention, and nowhere in the '073 reference is it disclosed that the bridging group between the succinic acid group and the cationic nitrogen is an oxyalkylated structural unit. Anticipation is a technical defense which must meet standards: Unless all of the same elements are found in exactly the same situation and united in the same way to perform the identical function in a single prior art reference, there is no anticipation. Therefore the rejection of claims 7 and 8, as amended under 35 U.S.C. §102(b) as being anticipated by Japanese reference JP 05193073 Kamijukkoku should be withdrawn for the reason that the structure of Applicant's compound is not found in the Japanese reference '073.

The rejection of Claim 10 under 35 U.S.C. §103(a) as being unpatentable over Vartanian in view of Chou (U.S. Patent No. 4,329,239) is now moot in view of Applicant's amendment.

Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Vartanian in view of Voogd (U.S. Patent No. 3,818,876). The rejection of claim 9 under 35 U.S.C. §103(a) as being unpatentable over Vartanian in view of Voogd (U.S. Patent No. 3,818,876) should be withdrawn for the reason that neither the Vartanian reference or the Voogd reference disclose any method for preventing gas

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hydrate formation, and neither reference taken separately or together discloses Applicant's compound. As discussed hereinabove, the Vartanian reference relates to controlling gas emissions from internal combustion engines, not preventing gas hydrate formation. Deposit formation in internal combustion engines result during combustion at high temperatures and pressures. Gas hydrate formation occurs with light hydrocarbons at flowing conditions where no combustion is taking place. The Voogd reference also relates to a fuel system for reducing emissions from internal combustion engines, not gas hydrate formation. There is nothing in either non-analogous reference which would teach or direct anyone skilled in the art of preventing the formation of gas hydrates to use applicant's claimed compound. Therefore, the rejection of claim 9 under 35 U.S.C. 103(a) over Vartanian in view of Voogd is improper and should be withdrawn for the reason that both references relate to non-analogous art and neither reference teaches a method for preventing the formation of gas hydrates using Applicant's claimed compound.

Claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over Vartanian in view of Carlisle (U.S. Patent No. 5,439,603) and Chevron. Although claim 5 has been canceled, Applicant has amended claim 1 to include the limitation of claim 5 wherein  $m = 1$  to 30. As stated hereinabove, Vartanian relates to a **carburetor detergent** to reduce exhaust gas emissions from the burning of fuels in an internal combustion engine. Vartanian discloses that engine deposits which result from the blow-by of exhaust gases in the crankcase zone of the engine can be reduced by a fuel additive (detergent) comprising a quaternary ammonium salt of succinimide, wherein the bridge between the succinic acid group and the cationic nitrogen compound is only disclosed to be a divalent hydrocarbon radical having 2-10 carbon atoms (See column 2, lines 29-30). Thus, Vartanian teaches away or is at best silent on any other type of chemical bridge. Carlisle relates to a novel lubricating oil soluble compound for use as a **dispersant in lubricating oils** which a compound having a succinimide structure as follows:

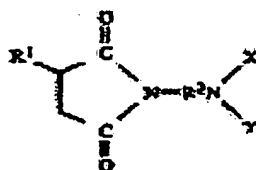
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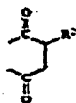
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and discloses that  $R^2$  is a divalent group having many alternatives including alkenes, polyethers and aromatics or araliphatics (See below an excerpt from Carlisle from columns 2, line 45 to column 3, line 18).

a divalent group such that  $H_2NR^2NXY$  is an alkylene amine, such as an ethylene or propylene amine, e.g.  $R^2$  is  $-(CH_2CH_2NH)_kCH_2CH_2-$  where  $k$  is zero or an integer from 1 to 7 preferably 2 to 6, alternatively a mixed ethylene/propylene amine e.g.  $H_2N(CH_2)_2NH(CH_2)_3NH(CH_2)_2NH_2$  can be used,  $X$  and  $Y$  are independently either hydrogen, alkyl, preferably  $C_1$ - $C_6$ , more preferably methyl or ethyl or hydroxy alkyl, preferably  $C_1$ - $C_6$ , most preferably hydroxyethyl, or together form the group:



Alternatively,  $R^2$  in the formula (I) may be a divalent group such that  $H_2NR^2NXY$  is an alkanolamine or a polyether amine. Typically such alkanolamines may contain the group  $-N(CH_2CH_2NHCH_2CH_2OH)$  (i.e.  $R^2=CH_2CH_2$ ,  $X=H$ ,  $Y=CH_2CH_2OH$ ) and typically

such polyether amines may contain the group  $-N(CH_2CH_2OCH_2CH_2OCH_2CH_2NH_2)$  (i.e.  $R^2=(CH_2CH_2O)_kCH_2CH_2-$ ,  $X=Y=H$ ). Useful commercially available polyether amines are the *Jeffamines* (JEDA) marketed by Tulsco.  $R^2$  is preferably an alkylene group e.g. of 2 to 40 carbons, optionally interrupted with at least one O or NH group, and in particular contains one or more units of alkylene oxide or alkylene amino groups each of 2 to 4 carbons.

$R^2$  may also be a divalent group such that  $H_2NR^2NXY$  is an aromatic or araliphatic amine e.g. of 6-20 carbons such as phenylene or biphenylene diamines or bis(amino benzy)s.

Where one of  $X$  and  $Y$  is hydrogen,  $R^2$  may be an alkylene group e.g.  $-(CH_2CH_2)-$ . It is preferred that the diamine used in the present invention contains at least 2 preferably from 3 to 7 active nitrogens (i.e. primary or secondary).

The "Chevron reference" is a general, non-specific statement and relates to a gasoline additive consisting of polyether amines. The "Chevron reference" US Patent 5,439,603, in Formula (I) with  $R^2$  as disclosed at col 3, line 3, is a compound having an electrically neutral nitrogen atom, and which is not the same as Applicant's ammonium compound. **"Chevron" very simply states that polyether amines are highly effective for fighting deposits in an engine's intake system and avoiding combustion chamber deposits in gasoline burning engines.** The examiner argues that one skilled in the art of gas hydrate inhibitors would take the **carburetor detergent** of Vartanian and selectively combine the polyether bridge from the hundreds of  $R^2$ 's disclosed in Carlisle's tertiary amines for **lubricating oils**, not fuels, because the Chevron reference makes the general statement, not in any related to succinic acid derivatives or quaternary ammonium compounds, that polyethers exhibit deposit reducing properties in fuels. An internal combustion

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engine burns fuels, not lubrication oils, and no one skilled in the art of gas hydrate formation prevention would select the polyamine unit structure of a chemical bridge between the succinic acid group and a quaternary ammonium group from a dispersant for lubricants based on the Chevron statement about fuels without the benefit of improper hindsight. Obvious-to-try is not the basis for 35 U.S.C. 103. The mere fact that the disclosures of references can be combined does not make the combination obvious unless the art also contains something to suggest the desirability of the combination. It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. It is wrong to use the Applicant's disclosure as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the instant claims. Therefore, any rejection of amended claim 1 as being obvious under 35 U.S.C. 103(a) over Vartanian in view of Carlisle (U.S. Patent No. 5,439,603) and Chevron should be withdrawn for the reason that the fact that the disclosures of references can be combined does not make the combination obvious unless the art also contains something to suggest the desirability of the combination. Furthermore, prior art is pertinent for its purposes of Section 103 if its elements, problems or purposes are reasonably analogous to those of the claim in suit. None of the art cited by the examiner in any way relates to prevention of gas hydrate formation in light hydrocarbon streams. No hydrocarbon combustion or fuel gas emission or any engine deposit occurs in gas hydrate formation or prevention thereof.

It is respectfully submitted that, in view of the above remarks, the objections to the claims and rejections under 35 U.S.C. §112, §102 and §103 should be withdrawn and that this application is in a condition for an allowance of all pending claims. Accordingly, favorable reconsideration and an allowance of all pending claims are courteously solicited.

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An early and favorable action on the merits is respectfully requested.

Respectfully submitted,



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